UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/685,052	10/06/2000	Brian Wesley Damon	LE9-99-149	3140

21972 7590 09/13/2005

LEXMARK INTERNATIONAL, INC.
INTELLECTUAL PROPERTY LAW DEPARTMENT
740 WEST NEW CIRCLE ROAD
BLDG. 082-1
LEXINGTON, KY 40550-0999

EXAMINER	
THOMPSON, JAMES A	
ART UNIT	**PAPER NUMBER**
2624	

DATE MAILED: 09/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/685,052	DAMON ET AL.
	Examiner	Art Unit
	James A. Thompson	2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 24 June 2005.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,2,4-6,9,11,12,14,15 and 17-19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 06 October 2000 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 24 June 2005 have been fully considered but they are not persuasive.

Regarding page 7, line 3 to page 9, line 6: Firstly, Yoshida (US Patent 5,719,680) was already demonstrated by Examiner to teach halftoning and a halftone screen in the Advisory Action dated 02 February 2005. In Applicant's arguments submitted with the Request for Continued Examination (RCE) dated 22 February 2005, Examiner's prior explanation with regard to halftoning and halftone screens in Yoshida were not addressed, nor has any attempt been made to address Examiner's prior explanation in the present arguments. Thus, Examiner repeats the arguments made in said Advisory Action below.

> "Yoshida (US Patent 5,719,680) clearly and unambiguously teaches color halftoning. This is evidenced by several factors:
>
> (1) The apparatus of Yoshida includes image data memory (figure 1(5) of Yoshida) which stores image data that is to be reproduced by image forming elements (figure 1(3) of Yoshida) which are controlled by driving elements (figure 1(2) of Yoshida), wherein said image forming elements and said driving elements are part of the print head (figure 1(1) of Yoshida) (column 2, lines 17-22 of Yoshida).
>
> (2) Yoshida does not, as Applicant contends, merely print solid colors. The "solid colors" are the colors printed as dots by the cyan, magenta, yellow and black print heads in order to produce an image (column 1, lines 30-34 of Yoshida). Yoshida clearly states "It is accordingly an object of the present invention to improve color registration in a color printer. The invented color printer has a plurality of printing heads for generating images in different colors, which are printed in a superimposed fashion on a printing medium. Each image is generated one line

at a time, each line consisting of at least two parts." Correcting color registration is purely an aspect of halftone image artifact correction since color registration correction is the correction of the precise distances of each of the primary color dots, such as cyan, magenta, yellow and black, used to form a color image. Further, as the quoted passage clearly states, the plurality of printing heads are for *generating images in different colors*, which are printed in a superimposed fashion on a printing medium. This is clearly halftoning of color images.

(3) Figure 5 of Yoshida does not, as Applicant contends, show a solid pattern. If one simply observes figure 5 of Yoshida, one can clearly see that white circles are *not* present at each dot position. Further, figure 5 of Yoshida is used illustratively to show the how the magenta dots are skew corrected with respect to the yellow dots (column 2, line 64 to column 3, line 7 of Yoshida). Figure 5 of Yoshida is not meant to exhaustively demonstrate all possible operations of the invention of Yoshida.

(4) As is abundantly well-known to those of ordinary skill in the art, color halftoning is performed by printing solid color dots, in this case the commonly used primary colors cyan, magenta, yellow and black, in a specifically superimposed manner to form a color image. As discussed above, this is clearly the function of the invention of Yoshida. The "solid colors" that Applicant alleges are, in fact, merely the individual cyan, magenta, yellow and black dots that are used in the overall formation of the image. These solid color dots are the individual dots that are used in halftoning operations to form the overall color image (column 1, lines 32-34 of Yoshida).

(5) "A patent need not teach, and preferably omits, what is well known in the art. *In re Buchner*, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991); *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), cert. denied, 480 U.S. 947 (1987); and Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 1463, 221 USPQ 481, 489 (Fed. Cir. 1984)." (see MPEP §2164.01) Applicant admits that "[h]alftoning is well established" (page 2, lines 17-

> 18 of Applicant's arguments), which is true. Further, though Yoshida may not specifically use the word "halftoning" in the disclosure, for the above reasons, among others, it would be abundantly clear to one of ordinary skill in the art that the invention of Yoshida does, in fact, teach color halftoning." [page 2, line 4 to page 4, line 4 of said Advisory Action]

Examiner hereby respectfully requests that Applicant address the above *repeated* arguments as said arguments have not yet been responded to in a timely manner and Applicant clearly continues to contest the fact that Yoshida teaches halftoning and a halftone screen.

Applicant states on page 7, lines 11-13, "The rejections further states that use of a halftone screen is inherent in applying data to a printhead. This is not acknowledged, and some teaching or authority is respectfully requested." *Examiner responds* that Applicant is misstating Examiner's position. Examiner has not suggested that *all* printheads in *all* situations inherently require a halftone screen. In fact, Examiner has specifically argued in the previous office action, dated 19 April 2005:

> "Since the dot data for the print heads is supplied to the LED heads (column 3, lines 16-18 of Yoshida), it is inherent that an associated halftone screen is applied to each of the bytemaps since said associated halftone screens are required for determining print dot locations for each printed color. In order to print the image, said associated halftone screens inherently have to be applied to each color that is to be printed, which would therefore include both the skew corrected image bytemaps and the image bytemaps not receiving application of electronic printhead skew correction." [page 4, lines 18-27 of said previous office action]

Thus, Examiner is arguing that the particular print head taught by Yoshida inherently requires a halftone screen, due to the fact that said print head prints using dot data supplied to LED heads for each of the four primary colors of cyan, magenta, yellow and black. In addition to the detailed and sufficient evidence given above on pages 2-4, and in addition to the fact that one of ordinary skill in the art would clearly and unambiguously have recognized Yoshida as teaching halftoning and halftone screens, Examiner also wishes to provide the requested authority for proving that halftoning and a halftone screen is inherent.

(6) Wang (US Patent 5,748,330) demonstrates an electrophotographic printer (column 1, lines 7-10 of Wang) that prints individual dots in a two-dimensional rectangular grid pattern (figures 3A-3D of Wang) by performing halftoning using a halftone screen (column 6, lines 6-15 of Wang). Further, Wang teaches as part of the prior art that halftone printing using said two-dimensional array was already known in the art of digital printing (column 3, lines 54-60 of Wang). Areas of "solid color" are used in the generation of an image (column 3, lines 57-64 of Wang). Applicant will note that Yoshida is also an electrophotographic printer (column 2, lines 5-9 of Yoshida) that prints individual colors in a superimposed fashion on a print medium to generate a resultant image (column 1, lines 32-36 of Yoshida) using the same sort of two-dimensional rectangular grid as shown in Wang (see figure 5 of Yoshida and figures 3A-3D of Wang). In both Wang and Yoshida, a rectangular grid is used to address column and row of where a dot is to be placed. In fact, this type of representation is commonly used in literature in the halftoning arts to show how the dots are

arranged since a high-powered magnifying glass or a microscope is required to see the real dots that are physically printed on a physical medium.

(7) Kroon (US Patent 5,841,458) teaches in the Background how color electrophotographic printing works. Kroon states that:

> "Color laser printers implement an electrophotographic process for recording and registering a multi-color image on an electrophotographic surface or a print medium, such as paper. Image data representing each primary color plane and generated in a personal computer are sent to the laser printer, which converts the image data to binary electrical signals that represent the dots forming the image. Each of the binary signals represents either a light or dark state of one dot in the image pattern. Depending on the state of each dot, the binary signals modulate a laser beam either ON or OFF as it is directed to an electrically charged light sensitive surface of a drum, which records the image pattern. A spinning multifaceted mirror scans the modulated laser beam in raster fashion along the length of the drum, and the drum incrementally rotates about its longitudinal axis by one dot position so that each successive scan of the laser beam is recorded in proper registration immediately after the previous scan." [column 1, lines 11-29 of Kroon]

The above quote from Kroon is clearly a description of halftoning and the use of a halftone screen, as commonly understood in the art. Further, Kroon specifically states that halftoning is performed using the color laser printer (column 1, lines 5-9 of Kroon). Again, the printer taught by Yoshida is also an electro-photographic printer (column 2, lines 5-9 of Yoshida) that prints individual colors in a superimposed fashion on a print medium to generate a resultant image (column 1, lines 32-36 of Yoshida). The printing is performed using digital high

or low signals to drive the individual printing LED's (figure 10; column 2, lines 5-9; and column 5, line 62 to column 6, line 3 of Yoshida).

Another important similarity between Yoshida and Kroon which demonstrates conclusively that Yoshida teaches halftoning and halftone screens is that Yoshida prints *image data* using the print head (figure 1 (5); column 2, lines 10-14 and lines 17-22; and column 5, lines 62-66 of Yoshida), and not mere solid colors as Applicant has alleged on page 8, lines 16-18 of the present arguments. As stated before, the four primary colors of cyan, magenta, yellow and black are commonly used in the art to print image data. Further, the term "image data" as commonly understood in the art relates to images a person would take with a camera, draw, or otherwise generate. "Image data" is not generally a mere splattering of four different colors, which happen to coincide with the commonly used primary ink colors, in an image space.

(8) Kawakami (US Patent 5,497,180) also demonstrates halftoning (column 15, lines 39-42 of Kawakami) through the use of the same four primary colors as taught by Yoshida (column 15, lines 4-13 of Kawakami). Both Kawakami and Yoshida are performed using a common electro-photographic printer.

(9) As stated above, "A patent need not teach, and preferably omits, what is well known in the art. *In re Buchner*, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991); *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), cert. denied, 480 U.S. 947 (1987); and Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 1463, 221 USPQ 481, 489 (Fed. Cir. 1984)" (see MPEP §2164.01). Yoshida is concerned with a

particular aspect of color printing, namely a printer and printing method that improved color registration through skew-correction (column 1, lines 6-10 of Yoshida). Since color halftoning is clearly old and well-known in the art, Yoshida was not required to discuss the details of how halftoning and halftone screens work, especially since it would have been abundantly clear to those of even basic skill in the art that Yoshida teaches a particular aspect of halftoning. Another example of halftoning that demonstrates the same type of halftoning performed in Yoshida is taught by Berns (*Principles of Color Technology*, by Roy S. Berns, © 2000, John Wiley & Sons, pages 170-174). Berns demonstrates performing halftoning by printing dots in a rectangular grid (page 172, figure and caption at top of left column; and page 171, left column, lines 1-13 of Berns), which is what the printer of Yoshida does (figure 5 and column 2, line 64 to column 3, line 7 of Yoshida).

On page 8, line 16 of Applicant's present arguments, *Applicant argues* that "[c]orrecting the skew of a printhead does not necessarily involve a halftone screen." *Examiner responds* that Examiner has made no such assertion. Further, it is not incumbent upon Examiner to prove that *all* forms of skew correction for *all* types of printheads inherently require a halftone screen. Examiner merely has to demonstrate that the particular type of skew correction performed using the particular type of printhead taught by Yoshida would inherently require some form of halftone screen. Examiner has demonstrated that the printer performs skew correction specifically on the printed dots. Owing to the printing of the dots to form the images stored in memory (figure 1(5) and column 2, lines 15-22 of Yoshida), a halftone screen is required.

On page 9, lines 3-4 of Applicant's present arguments, *Applicant argues* that "even if Yoshida included halftoning, which it does not, it certainly does not address reducing artifacts resulting from halftoning. Yoshida is only about deskewing." *Examiner responds* that misregistration due to image skewing ***is*** a printing artifact. By deskewing the image, and thus correcting the image registration, the image artifacts produced by said image skewing are mitigated. This point was already addressed, for example, in the arguments regarding claim 1 in said previous office action, and repeated below. As with so many other arguments presented by Examiner, Applicant has not even attempted to substantively address or rebut them.

Applicant is respectfully advised that, in accordance with 37 CFR §1.111 (b), "[t]he reply by the applicant or patent owner must be reduced to a writing which distinctly and specifically points out the supposed errors in the examiner's action and *must reply to every ground of objection and rejection in the prior Office action*" [emphasis added]. Thus, Applicant is advised to fully respond to the arguments given both above and below by Examiner, especially in light of the fact that some arguments have been given in prior office actions, but have hitherto been ignored by Applicant.

Regarding page 9, line 7 to page 10, line 24: In response to Applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., preserving individual characters) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir.

1993). Applicant states on page 9, lines 18-19 that "such application of Cullen cannot stand because Cullen does not preserve individual characters." Examiner notes that the limitation "preserving individual characters" or some reasonably similar variant thereof is not found in any of claims 2, 5-6, 15 and 17-19. The actual limitations recited in claims 2, 5-6, 15 and 17-19 have been rendered obvious by Yoshida in view of Cullen (US Patent 5,854,854) and Kamitani (US Patent 6,327,385 B1), as discussed in said previous office action and repeated below.

On page 10, lines 12-15, Applicant states that "Kamitani does not associate characters to anything at all similar to blocks since Kamitani is about segmenting [separating] characters. The parts of Kamitani cited in the Official Action say nothing about associating the segment characters." Examiner discusses the applied teachings of Kamitani on page 9, lines 5-8 of said previous office action. The manner of combination along with appropriate motivation is given on page 9, lines 9-23 of said previous office action. The limitation "identifying text characters which adjoin each other" is clearly taught in figure 5 and column 6, lines 39-49 of Kamitani, as cited in said previous office action. Figure 5 of Kamitani clearly shows two text characters ("H" and "I") which adjoin each other. Column 6, lines 39-49 of Kamitani describe in detail how the text character is identified, particularly with regard to the character and the type of font. The limitation "associating each character with a respective portion" is clearly taught in figure 7a, and on column 7, lines 28-32 and lines 36-43 of Kamitani. Figure 7a shows illustratively how the "H" and "I" are separated, and thus associated with their respective

portions. Column 7, lines 28-32 and lines 36-43 of Kamitani describe the masking procedure that is performed so that each character is separated and thus associated with their respective portion.

Regarding page 11, line 1 to page 12, line 4: Firstly, Examiner has explained on page 14, line 26 to page 15, line 4 how Cullen teaches identifying text which bridges adjoining blocks. Applicant has not responded to these arguments, but has merely asserted that Cullen does not teach identifying text which bridges adjoining blocks.

On page 11, line 23 to page 12, line 2 of Applicant's present arguments, Applicant states that "Saund is about reading text from a bound document. It employs information of the document shape to de-warp. This does not at all suggest deskewing by associating a text character with an image block as claimed." Here, Applicant has simply given Applicant's personal brief impression of the overall invention of Saund and has not in any way addressed the actual arguments presented by Examiner on page 16 of said previous office action.

Regarding page 12, lines 5-7: Again, Applicant is merely asserting what Applicant believes to be true, and does make any substantive arguments based on the arguments and citations presented by Examiner.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 4, 9 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida (US Patent 5,719,680).

Regarding claim 1: Yoshida discloses a method for reducing the occurrence of print artifacts in an imaging machine comprising the steps of applying electronic printhead skew correction to image data (column 2, lines 15-17 of Yoshida) corresponding to at least one of a plurality of image planes (column 2, lines 29-32 of Yoshida) to generate skew corrected image data (column 2, lines 19-22 of Yoshida); and applying an associated halftone screen (yellow halftone screen) to said skew corrected image (column 2, line 64 to column 3, line 2 of Yoshida) to reduce distortion which would be introduced by use of said associated halftone screen prior to said electronic printhead skew correction (column 3, lines 5-7 and lines 19-26 of Yoshida). The yellow halftone screen is applied (column 2, line 64 to column 3, line 2 of Yoshida). The magenta head, and thus the magenta halftone screen, is skew corrected (column 3, lines 19-25 of Yoshida) such that said magenta halftone screen is in the correct alignment with the yellow halftone screen (column 3, lines 25-28 of Yoshida), thus reducing any associated distortion that would have otherwise been present prior to skew correction.

Regarding claim 4: Yoshida discloses a method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of determining which of a plurality of printhead units require printhead skew correction (column 2, lines 15-17 of Yoshida); receiving continuous tone data to be

printed (column 2, lines 17-19 of Yoshida); generating from said continuous tone data a plurality of image bytemaps (column 2, lines 12-14 and lines 17-18 of Yoshida), each of said plurality of image bytemaps corresponding to a respective one of a plurality of image planes (column 2, line 64 to column 3, line 5 of Yoshida) and to a respective one of said plurality of printheads (column 2, lines 29-32 of Yoshida); and applying electronic printhead skew correction (figure 4 and column 2, lines 19-22 of Yoshida) to each image bytemap associated with a printhead unit requiring printhead skew correction (column 2, lines 58-63 of Yoshida) to generate a corresponding skew corrected image bytemap (column 2, lines 19-22 of Yoshida). Since image data is supplied for printing (column 2, lines 17-19 of Yoshida) and there are a plurality of print heads (column 2, lines 59-61 of Yoshida), then there are inherently a plurality of image bytemaps, since each bytemap is the data that each corresponding print head needs to print.

Yoshida further discloses applying an associated halftone screen to each of said corresponding skew corrected image bytemap and to each of said plurality of image bytemaps not receiving application of electronic printhead skew correction to form corresponding halftoned image data (column 3, lines 16-18 of Yoshida). Since the dot data for the print heads is supplied to the LED heads (column 3, lines 16-18 of Yoshida), it is inherent that an associated halftone screen is applied to each of the bytemaps since said associated halftone screens are required for determining print dot locations for each printed color. In order to print the image, said associated halftone screens inherently have to be applied to each color that is to be printed, which would therefore include both the skew

corrected image bytemaps and the image bytemaps not receiving application of electronic printhead skew correction.

Yoshida further discloses serializing each of said corresponding halftoned image data to a respective one of said plurality of printhead units (column 3, lines 14-18 of Yoshida). The data supplied to the print heads must inherently be halftone data in order for the print heads to print the image (column 3, lines 16-22 of Yoshida).

Regarding claim 9: Yoshida discloses a method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of determining which of a plurality of printhead units require printhead skew correction (column 2, lines 15-17 of Yoshida); receiving continuous tone data to be printed (column 2, lines 17-19 of Yoshida); and generating from said continuous tone data a plurality of image bytemaps (column 2, lines 12-14 and lines 17-19 of Yoshida), each of said plurality of image bytemaps corresponding to a respective one of a plurality of image planes (column 2, line 64 to column 3, line 5 of Yoshida) and to a respective one of said plurality of printheads (column 2, lines 29-32 of Yoshida); and establishing at least one halftone screen (figure 5 and column 2, lines 18-22 of Yoshida). Supplying data to a print head (figure 5 and column 2, lines 21-22 of Yoshida) inherently requires a halftone screen in order to obtain the print dot locations.

Yoshida further discloses, for each of said plurality of image planes associated with a printhead requiring printhead skew correction, shifting a starting point of application of said at least one halftone screen to the corresponding image bytemap in a direction opposite to and of a magnitude equal to a shift direction and shift magnitude of an electronic printhead

skew correction which is to be applied (column 3, lines 19-28 of Yoshida). To correct the skew of the magenta head, the print head position is shifted to compensate (column 3, lines 19-25 of Yoshida) and is thus correctly superimposed on the yellow image (column 3, lines 25-28 of Yoshida). Printing the dots for the magenta head (column 3, lines 20-25 of Yoshida) inherently requires a halftone screen in order to determine the location of the printed dots. Since the skew is corrected (column 3, line 19 of Yoshida) and the magenta head is thus properly aligned with the yellow image (column 3, lines 27-28 of Yoshida), then the starting point of said halftone screen must inherently be shifted in a direction opposite to and of a magnitude equal to a shift direction and shift magnitude of an electronic printhead skew correction in order to properly compensate for the amount of skew.

Yoshida further discloses applying said at least one halftone screen to said corresponding image bytemap (column 2, lines 17-22 of Yoshida). The image data for each print head (column 2, lines 17-19 of Yoshida) constitutes an image bytemap. A halftone screen is inherently required in order for each print head to print based on said image data.

Yoshida further discloses applying said electronic printhead skew correction to the halftone image bytemap of the first applying step (column 2, lines 15-17 of Yoshida); and serializing the halftoned image bytemap of the second applying step to the respective one of said plurality of printhead units (column 3, lines 14-18 of Yoshida).

Regarding claim 14: Yoshida discloses a method for reducing the occurrence of print artifacts in an imaging machine comprising the steps of applying an associated, pre-compensated

halftone screen (yellow halftone screen) (column 2, line 64 to column 3, line 2 of Yoshida) to image data (column 2, lines 15-17 of Yoshida) corresponding to at least one of a plurality of image planes (column 2, lines 29-32 of Yoshida) to reduce halftone noise introduced by electronic printhead skew correction (column 3, lines 5-7 and lines 19-28 of Yoshida); and applying electronic skew correction (column 2, lines 19-22 of Yoshida) to data resulting from said applying said pre-compensated halftone screen (column 3, lines 19-28 of Yoshida). The yellow halftone screen is applied (column 2, line 64 to column 3, line 2 of Yoshida). The magenta head, and thus the magenta halftone screen, is skew corrected (column 3, lines 19-25 of Yoshida) such that said magenta halftone screen is in the correct alignment with the yellow halftone screen (column 3, lines 25-28 of Yoshida), thus reducing any associated distortion that would have otherwise been present prior to skew correction.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2, 5-6, 15 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida (US Patent 5,719,680) in view of Cullen (US Patent 5,854,854) and Kamitani (US Patent 6,327,385 B1).

Regarding claims 2 and 15: Yoshida does not disclose expressly adding text characters to said skew corrected image data to form a composite bit map; dividing said composite bit map into a plurality of blocks; identifying text characters which bridge adjoining of said blocks; associating said identified text characters with a respective one of said plurality of blocks; and shifting an entirety of said each of said identified text characters by a skew correction factor associated with said respective one of said plurality of blocks.

Cullen discloses adding text characters to said skew corrected image data to form a composite bit map (figure 13 and column 4, lines 11-14 of Cullen); dividing said composite bit map into a plurality of blocks (column 4, lines 5-8 of Cullen); identifying text characters of each of said blocks (column 5, lines 46-55 of Cullen); associating said identified text characters with a respective one of said plurality of blocks (column 5, lines 35-36 and lines 46-49 of Cullen); and shifting an entirety of said each of said identified text characters by a skew correction factor associated with said respective one of said plurality of blocks (column 5, lines 53-55 of Cullen). Each rectangle of the composite document image is skew corrected based on the associated skew angle (column 5, lines 53-55 of Cullen). The correction by said skew angle is the skew correction factor associated with a particular rectangular block.

Yoshida and Cullen are combinable because they are from the same field of endeavor, namely skew correction for image print data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the method of correcting for the skew of text, as taught by Cullen, to the

general skew correction method taught by Yoshida. The motivation for doing so would have been to reduce the amount of required computer memory and increase the efficiency of the image processing (column 5, lines 22-27 of Cullen). Therefore, it would have been obvious to combine Cullen with Yoshida.

Yoshida in view of Cullen does not disclose expressly identifying text characters which bridge adjoining of said blocks; and associating said identified text with a respective one of said plurality of blocks.

Kamitani discloses identifying text characters which adjoin each other (figure 5 and column 6, lines 39-49 of Kamitani); and associating each character with a respective portion (figure 7a and column 7, lines 28-32 and lines 36-43 of Kamitani).

Yoshida in view of Cullen is combinable with Kamitani because they are from the same field of endeavor, namely correction of image print data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to detect characters which adjoin each other, as taught by Kamitani, which would result in a character adjoining two of said blocks taught by Cullen, and then separating each character into their respective portions, as taught by Kamitani, thus associating said identified text characters with a respective one of the blocks taught by Cullen. The motivation for doing so would have been to correct image data for the case of overlapping characters (column 1, lines 62-67 of Kamitani). Therefore, it would have been obvious to combine Kamitani with Yoshida in view of Cullen to obtain the invention as specified in claims 2 and 15.

Regarding claim 5: The arguments regarding claim 2 are incorporated herein. Since there are a plurality of image

bytemaps (column 2, lines 12-14 and lines 17-18 of Yoshida), each of said bytemap corresponding to a respective one of a plurality of image planes (column 2, line 64 to column 3, line 5 of Yoshida), then it is inherent that the text characters which are added to the skew corrected image data would therefore be added to at least one of said plurality of image bytemaps to generate at least one composite bytemap.

Regarding claim 6: Yoshida discloses a method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of determining which of a plurality of printhead units require printhead skew correction (column 2, lines 15-17 of Yoshida); receiving continuous tone data to be printed (column 2, lines 17-19 of Yoshida); and generating from said continuous tone data a plurality of image bytemaps (column 2, lines 12-14 and lines 17-18 of Yoshida), each of said plurality of image bytemaps corresponding to a respective one of a plurality of image planes (column 2, line 64 to column 3, line 5 of Yoshida) and to a respective one of said plurality of printheads (column 2, lines 29-32 of Yoshida), wherein at least one of said plurality of image bytemaps corresponds to a printhead which requires printhead skew correction (column 2, lines 59-63 of Yoshida). Since image data is supplied for printing (column 2, lines 17-19 of Yoshida) and there are a plurality of print heads (column 2, lines 59-61 of Yoshida), then there are inherently a plurality of image bytemaps, since each bytemap is the data that each corresponding print head needs to print.

Yoshida does not disclose expressly that at least one of said plurality of image bytemaps includes text characters; dividing said composite bit map into a plurality of blocks;

assigning a skew correction factor to each of said plurality of blocks; identifying characters which bridge adjoining of said blocks; associating each of said identified text characters with a respective one of said plurality of blocks; and shifting an entirety of said each of said identified text characters by a skew correction factor associated with said respective one of said plurality of blocks.

Cullen discloses that the image bytemap includes text characters (figure 13 and column 4, lines 11-14 of Cullen); dividing said composite bit map into a plurality of blocks (column 4, lines 5-8 of Cullen); assigning a skew correction factor to each of said plurality of blocks (column 5, lines 46-48 of Cullen); identifying text characters of each of said blocks (column 5, lines 46-55 of Cullen); associating said identified text characters with a respective one of said plurality of blocks (column 5, lines 35-36 and lines 46-49 of Cullen); and shifting an entirety of said each of said identified text characters by a skew correction factor associated with said respective one of said plurality of blocks (column 5, lines 53-55 of Cullen). Each rectangle of the composite document image is skew corrected based on the associated skew angle (column 5, lines 53-55 of Cullen). The correction by said skew angle is the skew correction factor associated with a particular rectangular block.

Yoshida and Cullen are combinable because they are from the same field of endeavor, namely skew correction for image print data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the method of correcting for the skew of text, as taught by Cullen, to the general skew correction method taught by Yoshida. The

motivation for doing so would have been to reduce the amount of required computer memory and increase the efficiency of the image processing (column 5, lines 22-27 of Cullen). Therefore, it would have been obvious to combine Cullen with Yoshida.

Yoshida in view of Cullen does not disclose expressly identifying text characters which bridge adjoining of said blocks; and associating said identified text with a respective one of said plurality of blocks.

Kamitani discloses identifying text characters which adjoin each other (figure 5 and column 6, lines 39-49 of Kamitani); and associating each character with a respective portion (figure 7a and column 7, lines 28-32 and lines 36-43 of Kamitani).

Yoshida in view of Cullen is combinable with Kamitani because they are from the same field of endeavor, namely correction of image print data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to detect characters which adjoin each other, as taught by Kamitani, which would result in a character adjoining two of said blocks taught by Cullen, and then separating each character into their respective portions, as taught by Kamitani, thus associating said identified text characters with a respective one of the blocks taught by Cullen. The motivation for doing so would have been to correct image data for the case of overlapping characters (column 1, lines 62-67 of Kamitani). Therefore, it would have been obvious to combine Kamitani with Yoshida in view of Cullen to obtain the invention as specified in claim 6.

Further regarding claims 17-19: Since the entire identified text character is associated with a respective one of said plurality of blocks and shifted by a skew correction

factor, as recited in claims 2, 5 and 6, from which claims 17, 18 and 19 respectively depend, then clearly the minority portion of each text character located in adjoining of said blocks is shifted.

6. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida (US Patent 5,719,680) in view of Cullen (US Patent 5,854,854) and Saund (US Patent 5,835,241).

Regarding claim 11: Yoshida discloses a method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of determining which of a plurality of printhead units require printhead skew correction (column 2, lines 15-17 of Yoshida); receiving continuous tone data to be printed (column 2, lines 17-19 of Yoshida); generating from said continuous tone data a plurality of image bytemaps (column 2, lines 12-14 and lines 17-18 of Yoshida), each of said plurality of image bytemaps corresponding to a respective one of a plurality of image planes (column 2, line 64 to column 3, line 5 of Yoshida) and to a respective one of said plurality of printheads (column 2, lines 29-32 of Yoshida), wherein at least one of said plurality of image bytemaps corresponds to a printhead which requires printhead skew correction (column 2, lines 59-63 of Yoshida); and applying electronic printhead skew correction (figure 4 and column 2, lines 19-22 of Yoshida) to each image bytemap associated with each said printhead unit which requires said printhead skew correction (column 2, lines 58-63 of Yoshida). Since image data is supplied for printing (column 2, lines 17-19 of Yoshida) and there are a plurality of print heads (column 2, lines 59-61 of Yoshida), then there are inherently a plurality of image

bytemaps, since each bytemap is the data that each corresponding print head needs to print.

Yoshida does not disclose expressly that at least one of said plurality of image bytemaps includes text characters; dividing said composite bit map into a plurality of blocks; assigning a skew correction factor to each of said plurality of blocks; identifying a vertical centerline of said each of said text characters; associating said vertical centerline of said each of said text characters with a respective one of said plurality of blocks; and, for each text character bridging a block boundary between an associated block and an adjacent block, performing the step of shifting a minority portion of said each text character located in said adjacent block not present in said associated block by an amount corresponding to a difference between a skew correction factor corresponding to said associated block and a skew correction factor corresponding to said adjacent block.

Cullen discloses that the image bytemap includes text characters (figure 13 and column 4, lines 11-14 of Cullen); dividing said composite bit map into a plurality of blocks (column 4, lines 5-8 of Cullen); assigning a skew correction factor to each of said plurality of blocks (column 5, lines 46-48 of Cullen); identifying a rectangle of said each of said text characters (column 5, lines 33-36 of Cullen); and associating said rectangle of said each of said text characters with a respective one of said plurality of blocks (column 5, lines 46-48 of Cullen). Each rectangle of the composite document image is skew corrected based on the associated skew angle (column 5, lines 53-55 of Cullen). The correction by said skew angle is the skew correction factor associated with a rectangle.

Cullen further discloses that each rectangular block is corrected for the corresponding skew correction (column 14, lines 51-57 of Cullen). Therefore, if there is a text character bridges a block boundary between an associated block and an adjacent block, then the portion of said character in the associated block will inherently be skew corrected by the skew correction performed for said associated block and the portion of said character in the adjacent block will inherently be skew corrected by the skew correction formed for said adjacent block.

Cullen does not disclose expressly using a vertical centerline instead of a rectangle for the steps of identifying and associating. However, using a vertical centerline instead of a rectangle would have been an obvious design choice to one of ordinary skill in the art since a vertical centerline can also be used to measure an angle, such as a skew angle, associated with a region. The use of vertical centerline for the measurement of an angle is an old and well-known method used in the calculation and manipulation of image regions.

Yoshida and Cullen are combinable because they are from the same field of endeavor, namely skew correction for image print data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the method of correcting for the skew of text, as taught by Cullen, to the general skew correction method taught by Yoshida. The motivation for doing so would have been to reduce the amount of required computer memory and increase the efficiency of the image processing (column 5, lines 22-27 of Cullen). Therefore, it would have been obvious to combine Cullen with Yoshida.

Yoshida in view of Cullen does not disclose expressly that, for each text character bridging a block boundary between an

associated block and an adjacent block, performing the step of shifting a minority portion of said each text character located in said adjacent block not present in said associated block by an amount corresponding to a difference between a skew correction factor corresponding to said associated block and a skew correction factor corresponding to said adjacent block.

Saund discloses using interpolating image data (column 13, lines 48-54 of Saund) in order to display said image data in a properly de-warped image space (column 13, lines 31-34 of Saund).

Yoshida in view of Cullen is combinable with Saund because they are from the same field of endeavor, namely the alignment of image data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to interpolate the image data to correct for warping, as taught by Saund. A text character bridging a block boundary between an associated block and an adjacent block would therefore have a minority portion shifted by an amount corresponding to a difference between a skew correction factor corresponding to said associated block and a skew correction factor corresponding to said adjacent block since the warping, or skew correction, amount for said minority portion would be an interpolation between said associated block and said adjacent block. The motivation for doing so would have been to properly show each pixel of an image in the transformed image space (column 13, lines 25-27 of Saund). Therefore, it would have been obvious to combine Saund with Yoshida in view of Cullen to obtain the invention as specified in claim 11.

Regarding claim 12: Yoshida discloses applying a halftone screen to said plurality of image bytemaps (column 2, lines 18-

22 of Yoshida) after the step of applying electronic printhead skew correction (column 2, lines 15-17 of Yoshida). Supplying data to a print head (figure 5 and column 2, lines 21-22 of Yoshida) inherently requires a halftone screen in order to obtain the print dot locations. Furthermore, since image data is supplied for printing (column 2, lines 17-19 of Yoshida) and there are a plurality of print heads (column 2, lines 59-61 of Yoshida), then there are inherently a plurality of image bytemaps, since each bytemap is the data that each corresponding print head needs to print.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James A. Thompson
Examiner
Art Unit 2624

JAT
01 September 2005

THOMAS D
~~TOMMY~~ LEE
PRIMARY EXAMINER